



BioMap and Living Waters

Guiding Land Conservation for Biodiversity in Massachusetts

Core Habitats of Middlefield

This report and associated map provide information about important sites for biodiversity conservation in your area.

This information is intended for conservation planning, and is not intended for use in state regulations.

Produced by:
Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries and Wildlife
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

Produced in 2004



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* Depending on the location of Core Habitats, your city or town may not have all of these sections.

Spring Salamander
(*Gyrinophilus porphyriticus*)
Species of Special Concern



Funding for this project was made available by the Executive Office of Environmental Affairs, contributions to the Natural Heritage & Endangered Species Fund, and through the State Wildlife Grants Program of the US Fish & Wildlife Service.



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Introduction

In this report, the Natural Heritage & Endangered Species Program provides you with site-specific biodiversity information for your area. Protecting our biodiversity today will help ensure the full variety of species and natural communities that comprise our native flora and fauna will persist for generations to come.

The information in this report is the result of two statewide biodiversity conservation planning projects, **BioMap** and **Living Waters**. The goal of the BioMap project, completed in 2001, was to identify and delineate the most important areas for the long-term viability of terrestrial, wetland, and estuarine elements of biodiversity in Massachusetts. The goal of the Living Waters project, completed in 2003, was to identify and delineate the rivers, streams, lakes, and ponds that are important for freshwater biodiversity in the Commonwealth. These two conservation plans are based on documented observations of rare species, natural communities, and exemplary habitats.

What is a Core Habitat?

Both BioMap and Living Waters delineate **Core Habitats** that identify the most critical sites for biodiversity conservation across the state. Core Habitats represent habitat for the state's most viable rare plant and animal populations and include exemplary natural communities and aquatic habitats. Core Habitats represent a wide diversity of rare species and natural communities (see Table 1), and these areas are also thought to contain virtually all of the other described species in Massachusetts. Statewide, BioMap Core Habitats encompass 1,380,000 acres of uplands and wetlands, and Living Waters identifies 429 Core Habitats in rivers, streams, lakes, and ponds.



Core Habitats and Land Conservation

One of the most effective ways to protect biodiversity for future generations is to protect Core Habitats from adverse human impacts through land conservation. For Living Waters Core Habitats, protection efforts should focus on the **riparian areas**, the areas of land adjacent to water bodies. A naturally vegetated buffer that extends 330 feet (100 meters) from the water's edge helps to maintain cooler water temperature and to maintain the nutrients, energy, and natural flow of water needed by freshwater species.

In Support of Core Habitats

To further ensure the protection of Core Habitats and Massachusetts' biodiversity in the long-term, the BioMap and Living Waters projects identify two additional areas that help support Core Habitats.

In BioMap, areas shown as **Supporting Natural Landscape** provide buffers around the Core Habitats, connectivity between Core Habitats, sufficient space for ecosystems to function, and contiguous undeveloped habitat for common species. Supporting Natural Landscape was



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generated using a Geographic Information Systems (GIS) model, and its exact boundaries are less important than the general areas that it identifies. Supporting Natural Landscape represents potential land protection priorities once Core Habitat protection has been addressed.

In Living Waters, *Critical Supporting Watersheds* highlight the immediate portion of the watershed that sustains, or possibly degrades, each freshwater Core Habitat. These areas were also identified using a GIS model. Critical Supporting Watersheds represent developed and undeveloped lands, and can be quite large. Critical Supporting Watersheds can be helpful in land-use planning, and while they are not shown on these maps, they can be viewed in the Living Waters report or downloaded from www.mass.gov/mgis.

Understanding Core Habitat Species, Community, and Habitat Lists

What's in the List?

Included in this report is a list of the species, natural communities, and/or aquatic habitats for each Core Habitat in your city or town. The lists are organized by Core Habitat number.

For the larger Core Habitats that span more than one town, the species and community lists refer to the entire Core Habitat, not just the portion that falls within your city or town. For a list of all the state-listed rare species within your city or town's boundary, whether or not they are in Core Habitat, please see the town rare species lists available at www.nhesp.org.

The list of species and communities within a Core Habitat contains only the species and

Table 1. The number of rare species and types of natural communities explicitly included in the BioMap and Living Waters conservation plans, relative to the total number of native species statewide.

BioMap		
Biodiversity Group	Species and Verified Natural Community Types	
	Included in BioMap	Total Statewide
Vascular Plants	246	1,538
Birds	21	221 breeding species
Reptiles	11	25
Amphibians	6	21
Mammals	4	85
Moths and Butterflies	52	An estimated 2,500 to 3,000
Damselflies and Dragonflies	25	An estimated 165
Beetles	10	An estimated 2,500 to 4,000
Natural Communities	92	> 105 community types
Living Waters		
Biodiversity Group	Species	
	Included in Living Waters	Total Statewide
Aquatic Vascular Plants	23	114
Fishes	11	57
Mussels	7	12
Aquatic Invertebrates	23	An estimated > 2500

natural communities that were explicitly included in a given BioMap or Living Waters Core Habitat. Other rare species or examples of other natural communities may fall within the Core Habitat, but for various reasons are not included in the list. For instance, there are a few rare species that are omitted from the list or summary because of their particular sensitivity to the threat of collection. Likewise, the content of many very small Core Habitats are not described in this report or list, often because they contain a single location of a rare plant



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species. Some Core Habitats were created for suites of common species, such as forest birds, which are particularly threatened by habitat fragmentation. In these cases, the individual common species are not listed.

What does 'Status' mean?

The Division of Fisheries and Wildlife determines a status category for each rare species listed under the Massachusetts Endangered Species Act, M.G.L. c.131A, and its implementing regulations, 321 CMR 10.00. Rare species are categorized as Endangered, Threatened, or of Special Concern according to the following:

- **Endangered** species are in danger of extinction throughout all or a significant portion of their range or are in danger of extirpation from Massachusetts.
- **Threatened** species are likely to become Endangered in Massachusetts in the foreseeable future throughout all or a significant portion of their range.
- **Special Concern** species have suffered a decline that could threaten the species if allowed to continue unchecked or occur in such small numbers or with such restricted distribution or specialized habitat requirements that they could easily become Threatened in Massachusetts.

In addition, the Natural Heritage & Endangered Species Program maintains an unofficial **watch list** of plants that are tracked due to potential conservation interest or concern, but are not regulated under the Massachusetts Endangered Species Act or other laws or regulations. Likewise, described natural communities are not regulated any laws or regulations, but they can help to identify ecologically important areas that are worthy of protection. The status of natural

Legal Protection of Biodiversity

BioMap and Living Waters present a powerful vision of what Massachusetts would look like with full protection of the land that supports most of our biodiversity. To create this vision, some populations of state-listed rare species were deemed more likely to survive over the long-term than others.

Regardless of their potential viability, all sites of state-listed species have full legal protection under the Massachusetts Endangered Species Act (M.G.L. c.131A) and its implementing regulations (321 CMR 10.00). Habitat of state-listed wildlife is also protected under the Wetlands Protection Act Regulations (310 CMR 10.37 and 10.59). The **Massachusetts Natural Heritage Atlas** shows **Priority Habitats**, which are used for regulation under the Massachusetts Endangered Species Act and Massachusetts Environmental Policy Act (M.G.L. c.30) and **Estimated Habitats**, which are used for regulation of rare wildlife habitat under the Wetlands Protection Act. For more information on rare species regulations, see the *Massachusetts Natural Heritage Atlas*, available from the Natural Heritage & Endangered Species Program in book and CD formats.

BioMap and Living Waters are conservation planning tools and do not, in any way, supplant the Estimated and Priority Habitat Maps which have regulatory significance. Unless and until the combined BioMap and Living Waters vision is fully realized, we must continue to protect all populations of our state-listed species and their habitats through environmental regulation.

communities reflects the documented number and acreages of each community type in the state:

- **Critically Imperiled** communities typically have 5 or fewer documented sites or have very few remaining acres in the state.
- **Imperiled** communities typically have 6-20 sites or few remaining acres in the state.
- **Vulnerable** communities typically have 21-100 sites or limited acreage across the state.
- **Secure** communities typically have over 100 sites or abundant acreage across the state; however excellent examples are identified as Core Habitat to ensure continued protection.



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Understanding Core Habitat Summaries

Following the BioMap and Living Waters Core Habitat species and community lists, there is a descriptive summary of each Core Habitat that occurs in your city or town. This summary highlights some of the outstanding characteristics of each Core Habitat, and will help you learn more about your city or town's biodiversity. You can find out more information about many of these species and natural communities by looking at specific *fact sheets* at www.nhesp.org.

Next Steps

BioMap and Living Waters were created in part to help cities and towns prioritize their land protection efforts. While there are many reasons to conserve land – drinking water protection, recreation, agriculture, aesthetics, and others – BioMap and Living Waters Core Habitats are especially helpful to municipalities seeking to protect the rare species, natural communities, and overall biodiversity within their boundaries. Please use this report and map along with the rare species and community fact sheets to appreciate and understand the biological treasures in your city or town.

Protecting Larger Core Habitats

Core Habitats vary considerably in size. For example, the average BioMap Core Habitat is 800 acres, but Core Habitats can range from less than 10 acres to greater than 100,000 acres. These larger areas reflect the amount of land needed by some animal species for breeding, feeding, nesting, overwintering, and long-term survival. Protecting areas of this size can be

very challenging, and requires developing partnerships with neighboring towns.

Prioritizing the protection of certain areas within larger Core Habitats can be accomplished through further consultation with Natural Heritage Program biologists, and through additional field research to identify the most important areas of the Core Habitat.

Additional Information

If you have any questions about this report, or if you need help protecting land for biodiversity in your community, the Natural Heritage & Endangered Species Program staff looks forward to working with you.

Contact the Natural Heritage & Endangered Species Program:

by Phone 508-792-7270, Ext. 200

by Fax: 508-792-7821

by Email: natural.heritage@state.ma.us.

by Mail: North Drive
Westborough, MA 01581

The GIS datalayers of BioMap and Living Waters Core Habitats are available for download from MassGIS: www.mass.gov/mgis

Check out www.nhesp.org for information on:

- Rare species in your town
- Rare species fact sheets
- BioMap and Living Waters projects
- Natural Heritage publications, including:
 - * Field guides
 - * Natural Heritage Atlas, and more!



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BioMap: Species and Natural Communities

Middlefield

Core Habitat BM750

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
High-Energy Riverbank		Vulnerable
High-Terrace Floodplain Forest		Imperiled
Northern Hardwoods - Hemlock - White Pine Forest		Secure
Shallow Emergent Marsh		Secure

Invertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Beaver Pond Clubtail	<i>Gomphus borealis</i>	Special Concern
Harpoon Clubtail	<i>Gomphus descriptus</i>	Endangered
Ocellated Darner	<i>Boyeria grafiana</i>	Special Concern
Ostrich Fern Borer Moth	<i>Papaipema sp. 2 near pterisii</i>	Special Concern
Rapids Clubtail	<i>Gomphus quadricolor</i>	Threatened
Riffle Snaketail	<i>Ophiogomphus carolus</i>	Threatened
Tule Bluet	<i>Enallagma carunculatum</i>	Special Concern
Twelve-Spotted Tiger Beetle	<i>Cicindela duodecimguttata</i>	Special Concern

Vertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
American Bittern	<i>Botaurus lentiginosus</i>	Endangered
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Special Concern

Core Habitat BM779

Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Large-Leaved Sandwort	<i>Moehringia macrophylla</i>	Endangered



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BioMap: Species and Natural Communities

Middlefield

Invertebrates

Common Name

Ocellated Darner

Scientific Name

Boyeria grafiana

Status

Special Concern



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BioMap: Core Habitat Summaries

Middlefield

Core Habitat BM750

This Core Habitat includes a long stretch of the Middle Branch of the Westfield River and surrounding upland forests. This area provides significant habitat for rare insect species, including dragonflies such as the Endangered Harpoon Clubtail. The Core Habitat also contains wetland habitats for American Bitterns, upland habitat for Jefferson Salamanders, and excellent riverbank and forested natural communities.

Natural Communities

This Core Habitat contains a long stretch of well-buffered, high-quality High-Energy Riverbank vegetation with good habitat and species diversity. High-Energy Riverbank communities are sparse, open graminoid communities found on cobble and sand deposits along fast-flowing rivers that experience severe flooding and ice scour. Much of the remainder of this Core Habitat is an extensive high-quality Northern Hardwoods-Hemlock-White Pine Forest with excellent habitat diversity. Northern Hardwoods-Hemlock-White Pine Forests have a mix of evergreen and deciduous trees, with a closed, full canopy, and sparse shrub and herbaceous layers. They commonly occur on north facing slopes and ravines with moderately acidic soils.

Invertebrates

This Core Habitat includes a 13-km stretch of the Middle Branch of the Westfield River and surrounding forested, unfragmented uplands that are critical habitat for many rare insect species. These species include river dragonflies such as the Harpoon Clubtail, Rapids Clubtail, and Riffle Snaketail; the Twelve-spotted Tiger Beetle, which inhabits the riverbanks; and the Ostrich Fern Borer moth, an inhabitant of the floodplain forest along the river. Many of these species also inhabit another Core Habitat located less than 5 km to the northeast, along the East Branch of the Westfield River. This proximity probably allows for occasional dispersal between these two areas. While a portion of this Core Habitat is within the Fox Den Wildlife Management Area and a few other relatively small tracts of conservation land, the majority of the area appears to be unprotected; conservation of the remaining areas of unprotected land within this Core Habitat is desirable to increase the amount of contiguous protected habitat and to help ensure the long-term viability of rare species inhabiting the area. Unusually large or frequent hydrologic changes resulting from the Littleville Dam may have adverse effects on rare invertebrate species within this Core Habitat.

Vertebrates

This Core Habitat encompasses wetland habitat for the American Bittern, a rare marsh bird. The area also contains vernal pools surrounded by upland forest that support a population of Jefferson Salamanders.



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BioMap: Core Habitat Summaries

Middlefield

Core Habitat BM779

This Core Habitat encompasses a section of the West Branch of the Westfield River and its surrounding uplands. Habitats here support rare insects, such as the Ocellated Darner dragonfly, and rare plants, including the Endangered Large-Leaved Sandwort.

Plants

One of only three known populations of the Endangered Large-Leaved Sandwort in Massachusetts grows within this Core Habitat.

Invertebrates

This Core Habitat includes a 6.5-km stretch of the West Branch of the Westfield River, its tributaries, and surrounding forested, unfragmented uplands that are habitat for the rare Ocellated Darner dragonfly. This Core Habitat is within dispersal distance of another Core Habitat for this species in Chester, which allows for movement of Ocellated Darners between these two areas. While some of this Core Habitat is within the Walnut Hill Wildlife Management Area, conservation of remaining areas of unprotected land within this Core Habitat is desirable to increase the amount of contiguous protected habitat and to help ensure the long-term viability of the Ocellated Darner and other rare species inhabiting the area.



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Living Waters: Species and Habitats

Middlefield

Core Habitat LW113

Fishes

Common Name

Lake Chub

Scientific Name

Couesius plumbeus

Status

Endangered

Core Habitat LW366

Exemplary Habitats

Common Name

Invertebrate Habitat

Scientific Name

Status

Core Habitat LW429

Exemplary Habitats

Common Name

Invertebrate Habitat

Scientific Name

Status

Invertebrates

Common Name

Creeper

Scientific Name

Strophitus undulatus

Status

Special Concern



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Living Waters: Core Habitat Summaries

Middlefield

Core Habitat LW113

This Core Habitat contains habitat for the state-Endangered Lake Chub. This fish requires moderate- to fast-flowing, clear, cold streams with gravel and rubble substrates. In spring, this species may move large distances to spawn (breed). Excess sediments can degrade the clean gravel needed for spawning and proper egg development. Increases in sediments cloud the water and impair this species' visual feeding. Sections of this Core Habitat are already protected, but further land protection along the riparian areas will help maintain the excellent quality of this habitat.

Core Habitat LW366

This section of Factory Brook emerges from the Middlefield State Forest where it flows from a large beaver-created wetland, through a hemlock-dominated forest and is joined by a short tributary. Both Factory Brook and its tributary support a healthy community of the more ecologically sensitive aquatic insects: mayflies, stoneflies, and caddisflies. The clear waters are shaded and cold, and they flow rapidly over a mix of stone sizes that provide excellent habitat for aquatic invertebrates. The forested stream banks help maintain the high-quality habitat by shading the water to keep it cool, by providing a natural energy source to the stream ecosystem in the form of leaves, needles, and sticks, and by controlling the runoff of sediments, excess nutrients, and water. This Core Habitat lies just outside the State Forest and appears to be the only unprotected stretch of the brook.

Core Habitat LW429

The Middle Branch of the Westfield River, along with its tributaries, provide key habitat for aquatic insects and freshwater mussels. This Core Habitat includes habitat for several species of state-listed dragonflies and damselflies, from the river's mainstem up to the small, acidic, headwater streams. These aquatic insects are good indicators of ecosystem health, suggesting that this Core Habitat contains high-quality freshwater habitats for other underwater species as well.

For example, Kinne Brook, supports the more ecologically sensitive aquatic insects: mayflies, stoneflies, and caddisflies. This brook originates in Worthington, flows south into Chester through agricultural lands and forests, and joins the Middle Branch of the Westfield River. The forested stream banks help maintain the high-quality habitat by shading the water to keep it cool, by providing a natural energy source to the stream ecosystem in the form of leaves, needles, and sticks, and by controlling the runoff of sediments, excess nutrients, and water.

The short stretch of the Middle Branch of the Westfield River below the Littleville Dam supports a population of the freshwater mussel, known as the Creeper mussel. This species is found in the pockets of sand and gravel that collect between the more typical cobble and boulders found along the river bottom.

Protecting the remaining unprotected riparian areas along the Westfield River, as well as the land surrounding its tributaries will aid in maintaining the integrity of these excellent freshwater habitats.



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